

#### **488d Interaction of Amphiphilic Molecules with Lipid Monolayers**

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An especially interesting and important problem in the general area of interfacial phenomena concerns the behavior of monolayers composed of mixtures of amphiphilic molecules, some of which are soluble in an adjacent bulk phase and some of which are insoluble. Successfully developing methods to predict the extent to which a soluble amphiphile present in a bulk phase will partition into a pre-formed insoluble monolayer will lead to a better understanding of many important processes; for example, understanding how surfactants present in a cell culture interact with cell membranes. Surface active agents are employed in cell culture for a variety of reasons: to prevent undesired adhesion of cells to air bubbles or solid surfaces, or to improve the delivery of nutrients to the cells.

Experimental monolayer penetration results are presented for the interaction of surfactants Pluronic F-68 and SDS with monolayers containing DPPC, POPC, and cholesterol. Monolayer compositions similar to those observed in Chinese hamster ovary (CHO) cell plasma membranes were used due to the widespread use of CHO cells in cell culture processes. Monolayer compositions computed using various models available in the literature are compared. Pluronic F-68 was observed to penetrate more in DPPC-rich domains than POPC-rich domains, while the opposite was observed for SDS. Cholesterol was found to have a pronounced effect on the penetration of soluble surfactants into lipid membranes.

The methodology developed here is generally applicable to the incorporation of a wide variety of amphiphilic molecules into lipid membranes. In addition to common surfactants, the interaction of model membranes with small drug molecules and amphiphilic peptides can be explored.